DATE: September 1, 2009

TITLE: 0.2 More and More

OBJECTIVE: To learn how to use exponents to describe a recursive rule.

IN: Assume the area of your desktop is equals 1. Your math book covers $\frac{1}{4}$ of your desktop, your calculator covers $\frac{1}{16}$ of your desktop and your scrap paper covers $\frac{1}{32}$ of your desktop.
What total area is covered by these objects?
Write an addition expression and then give your answer as a single fraction in lowest terms.

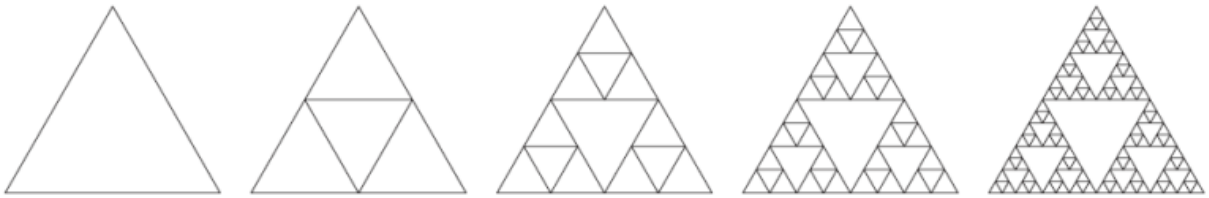
Did you notice, in the investigation from 0.1 that at each stage of a Sierpin'ski design, you have more to draw than in the previous stage?

The new parts get smaller, but the number of them increases quickly.

Today, we are going to examine those patterns more closely.

0.2 Investigation • How Many?

Explore how quickly the number of new triangles grows using multiplication repeatedly. Look for a pattern to help you *predict* the number of new triangles at each stage without counting them.



Stage 0 Stage 1 Stage 2 Stage 3 Stage 4

Step 1 Look at the fractal designs. Count the number of new upward-pointing triangles for Stages 0 to 4. Create this table to record your work.

Stage	Number of new upward-pointing triangles
0	1
1	
2	
3	
4	

Step 2 Look carefully at the chart…how does the number of new triangles compare to the number of new triangles at the previous stage? Be specific.

Step 3 Using your answer to Step 2, find how many new upward-pointing triangles are at Stages 5, 6, and 7.

Stage 5 =

Stage 6 =

Stage 7 =

Step 4 Explain how you could find the number of upward-pointing triangles at Stage 15 without counting.

At each stage, three new upward-pointing triangles are drawn in each of the upward-pointing triangles from the previous stage.
How is this the same as repeatedly multiplying by 3?

What can we use in math to write repeated multiplication quickly?

Let's look at the chart you created in Step 1.

I added 2 columns...add these same 2 columns in your notes.

Stage	Number of new upward-pointing triangles	Repeated Multiplication	Exponent Form
0	1		
1			
2			
3			
4			

Let's try a few exponent problems as review!

Write each multiplication expression in exponent form.

1. 5(5)(5)(5)(5)
2. 15x15x15
3. 2·2·2·2·2·2·2·2·2·2

Rewrite each expression as repeated multiplication.

1. 25^2
2. 3^4
3. 5^5

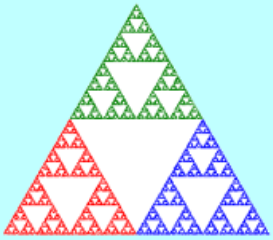
"SUMMARY"

Pick one...

Today I learned that...

OR

I still need help on...



"OUT"

Write each number with an exponent other than 1.

For example $125 = 5^3$

1. 27 =
2. 32 =